

# ARABIC SPEECH TO MOROCCAN SIGN LANGUAGE TRANSLATOR 'LEARNING FOR DEAF' - 1ST AFRICANLP WORKSHOP, INTERNATIONAL CONFERENCE ON LEARNING REPRESENTATIONS (ICLR 2020)

Abdelhak Mahmoudi;

;

© 2021, ABDELHAK MAHMOUDI



This work is licensed under the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/legalcode>), which permits unrestricted use, distribution, and reproduction, provided the original work is properly credited.

Cette œuvre est mise à disposition selon les termes de la licence Creative Commons Attribution (<https://creativecommons.org/licenses/by/4.0/legalcode>), qui permet l'utilisation, la distribution et la reproduction sans restriction, pourvu que le mérite de la création originale soit adéquatement reconnu.

AI4D initiative



International Development Research Centre  
Centre de recherches pour le développement international

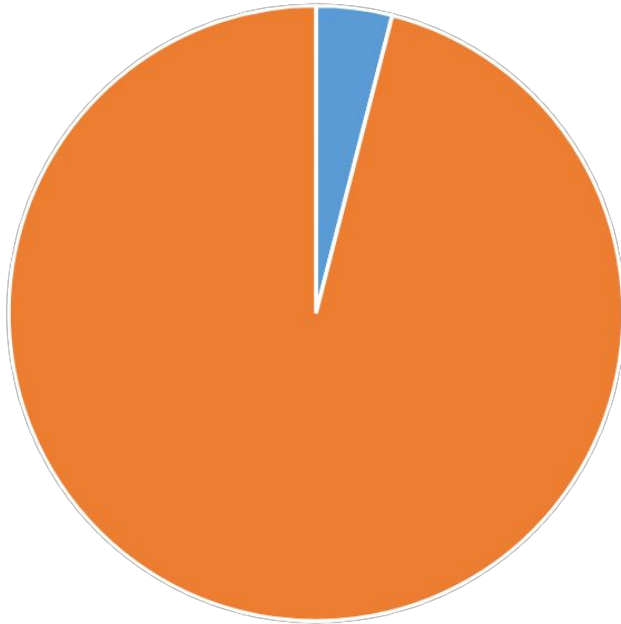


# Arabic Speech to Moroccan Sign Language Translator 'Learning for Deaf'

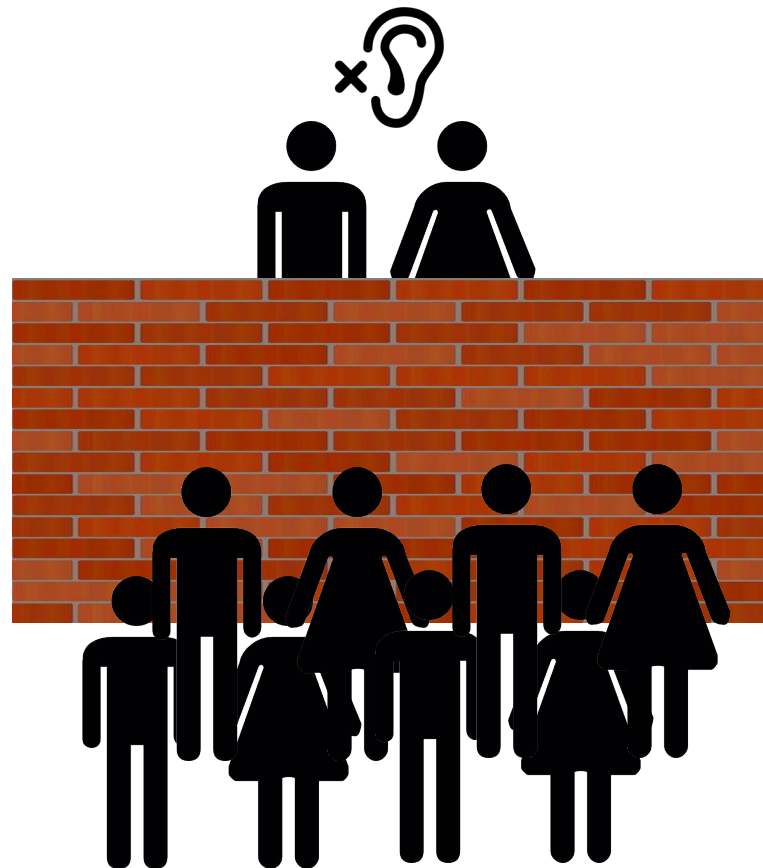
Abdelhak Mahmoudi  
IMIARF Lab, Mohammed V University,  
Rabat, Morocco

# Problem

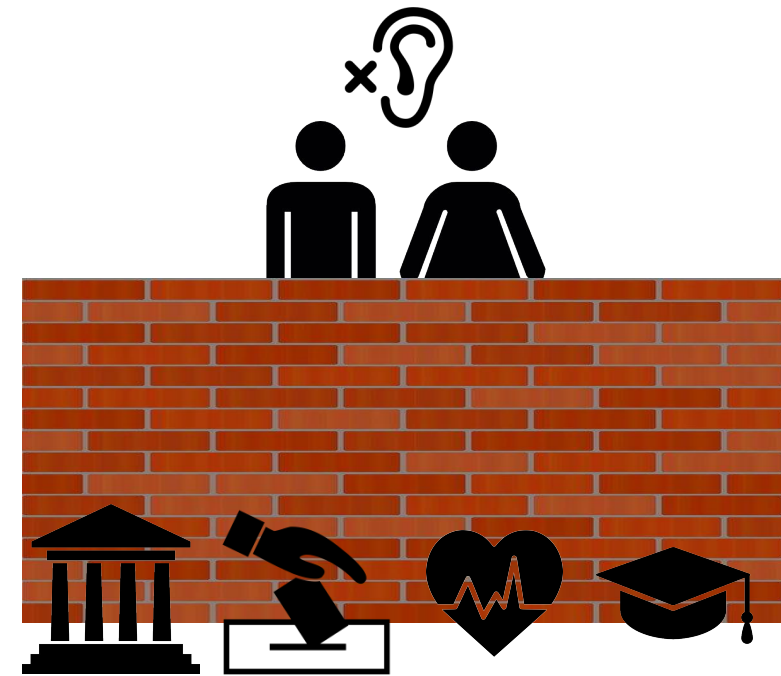
466 M disabling hearing loss



Marginalization



No access to public services

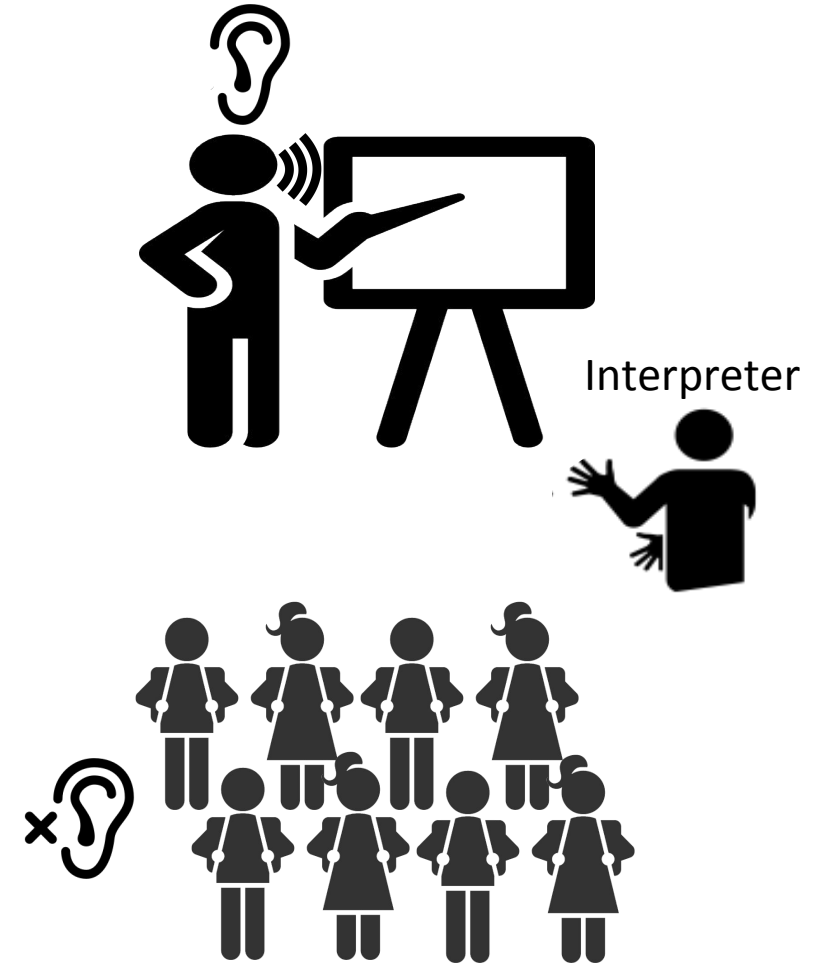
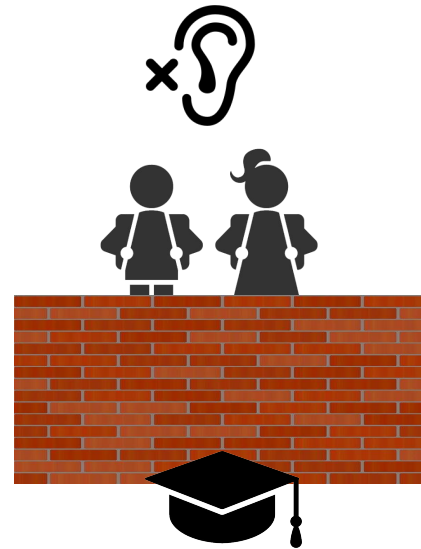


# Problem

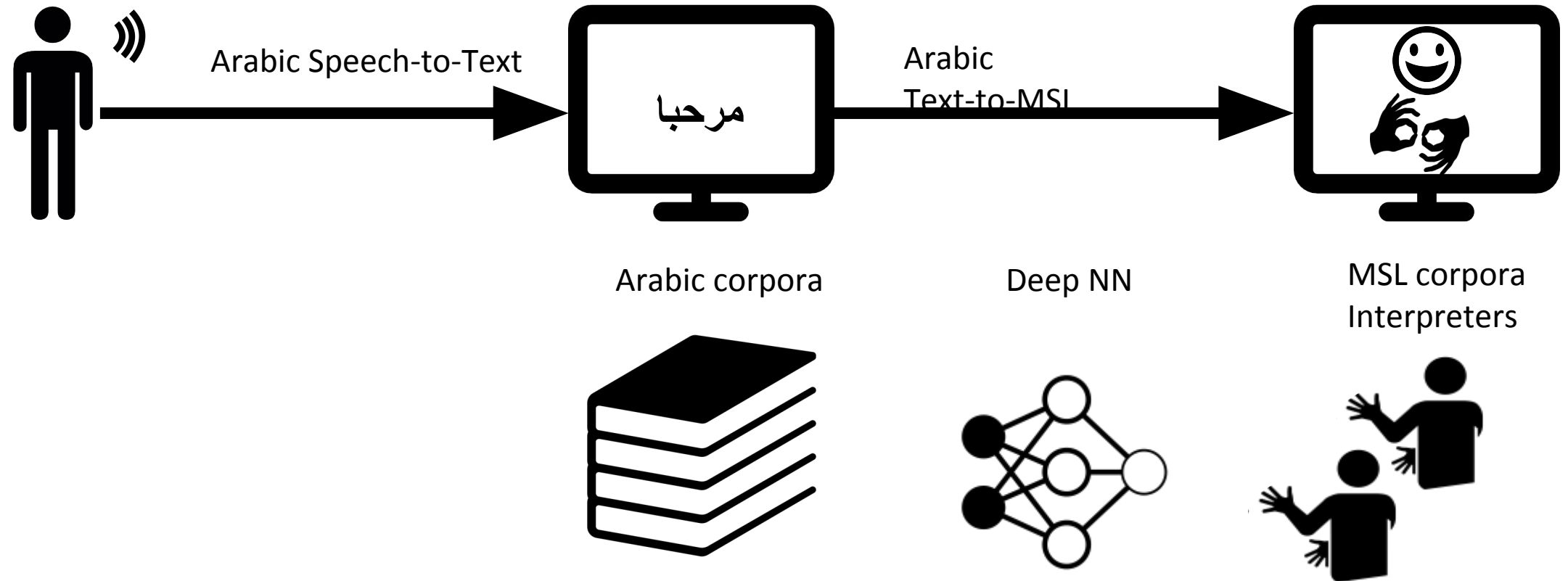
Multiple Sign Languages



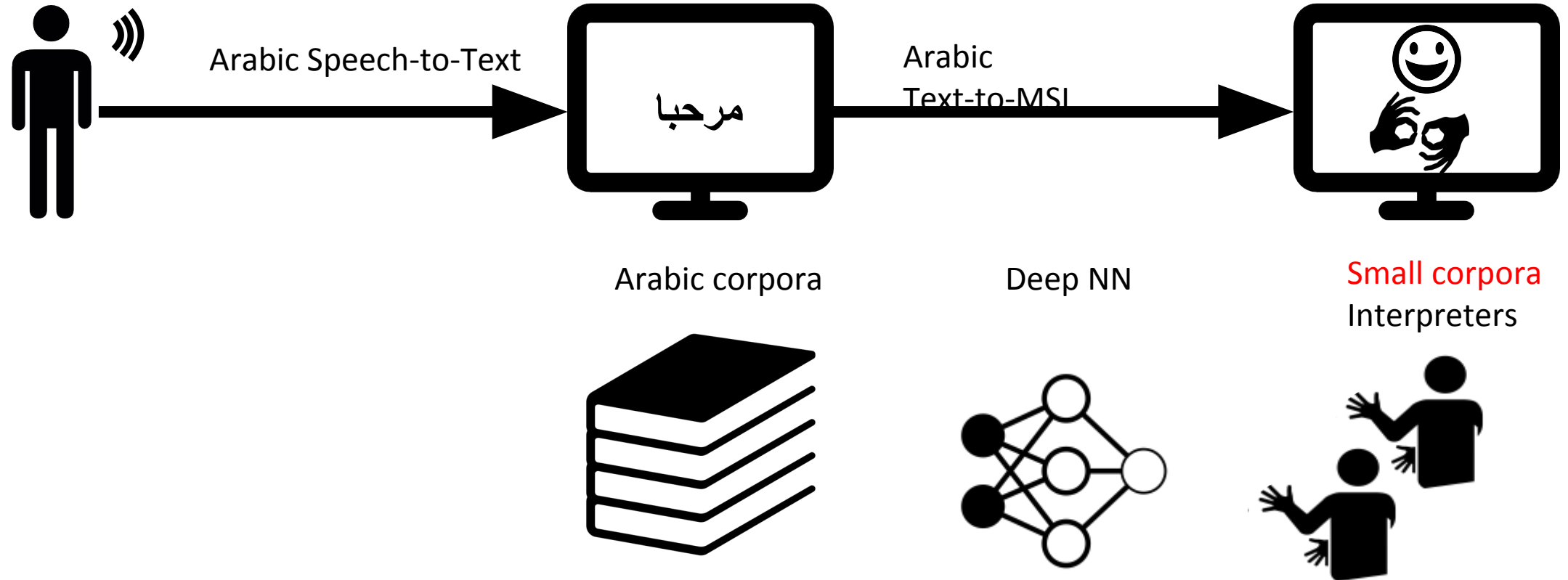
Moroccan  
Sign  
Language



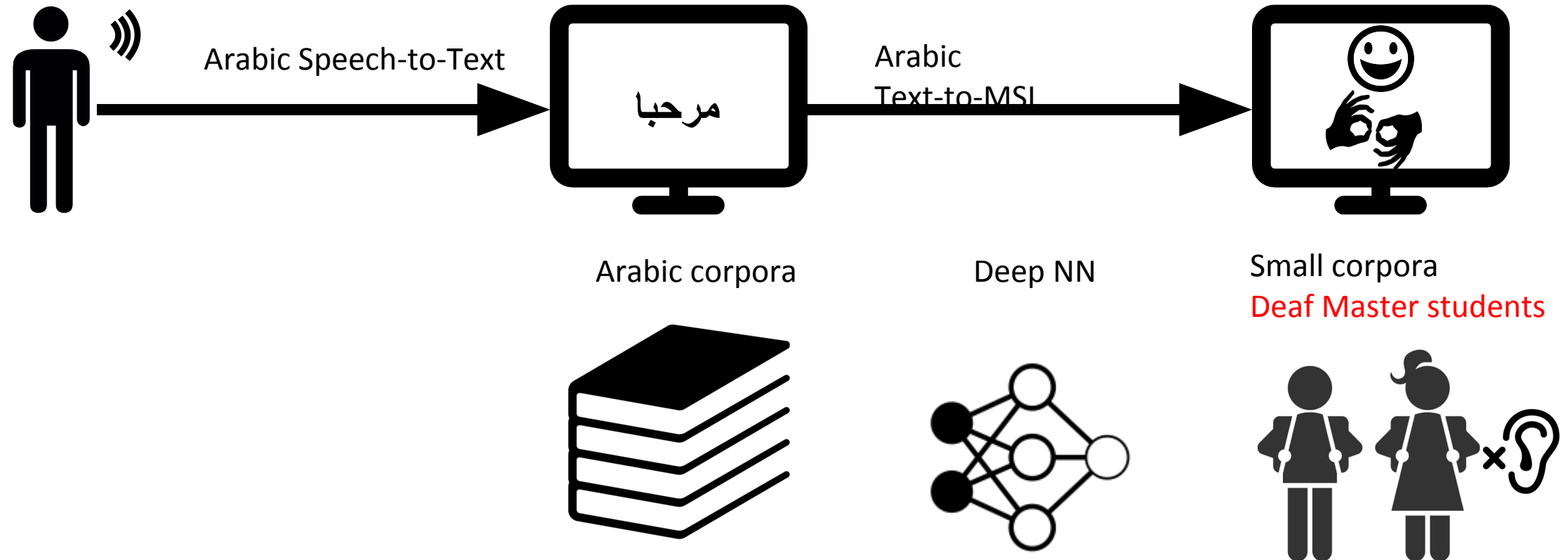
# Initial Objective



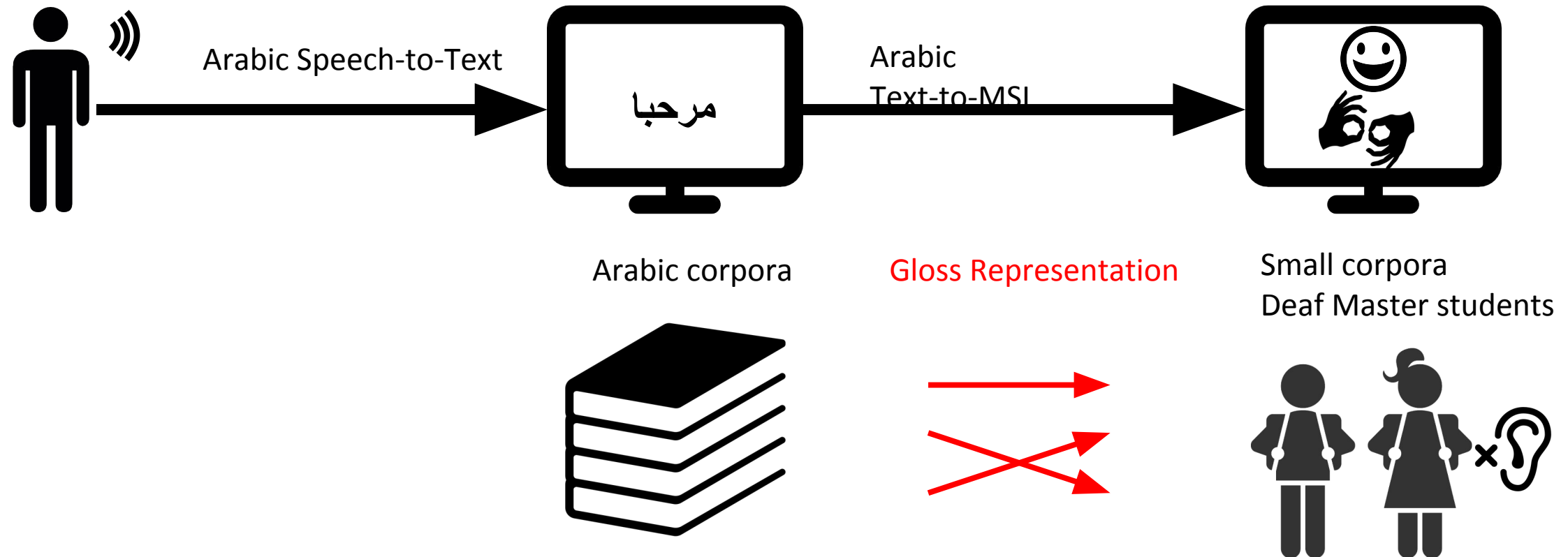
# Small Corpora



# Deaf Students in the Team



# Begin by a Gloss Representation





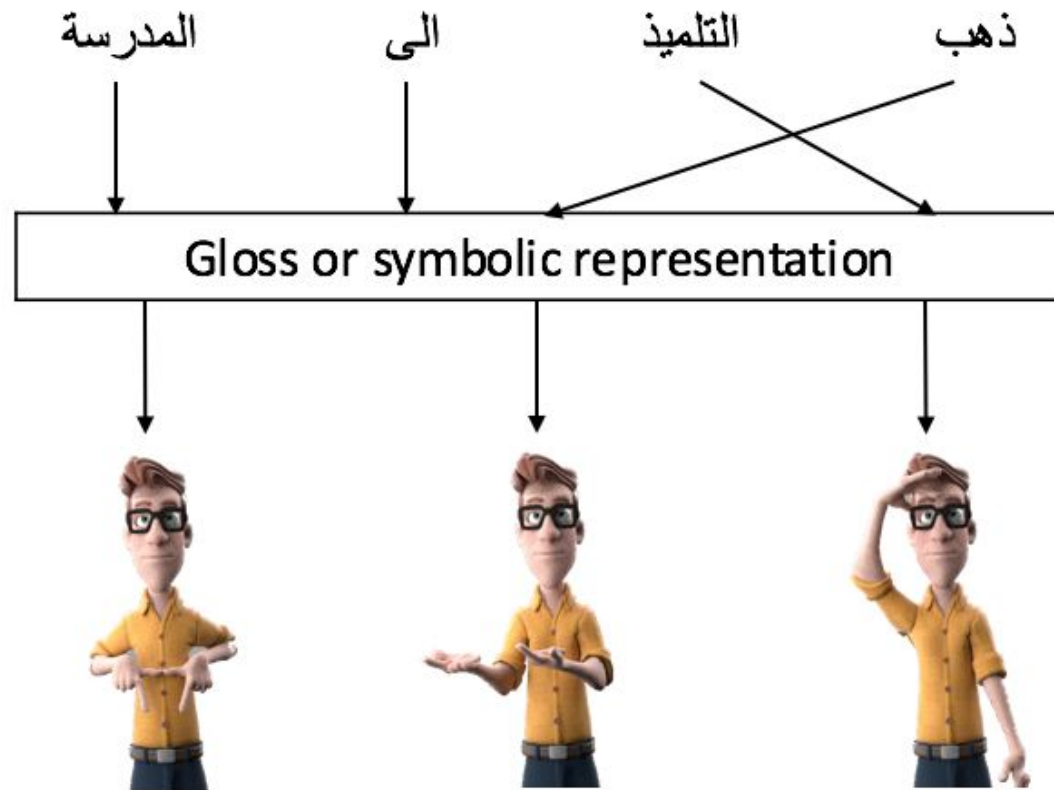
# Data Collection

- Lack of data resources about the Arabic sign language.
- We dedicated a lot of energy to collect our own datasets.
- Official and Non-official Data sources
- Collected ~100 initial sign phrases
- The dataset is composed of subtitled videos
- Created meta-data (videos category, video length, etc.)

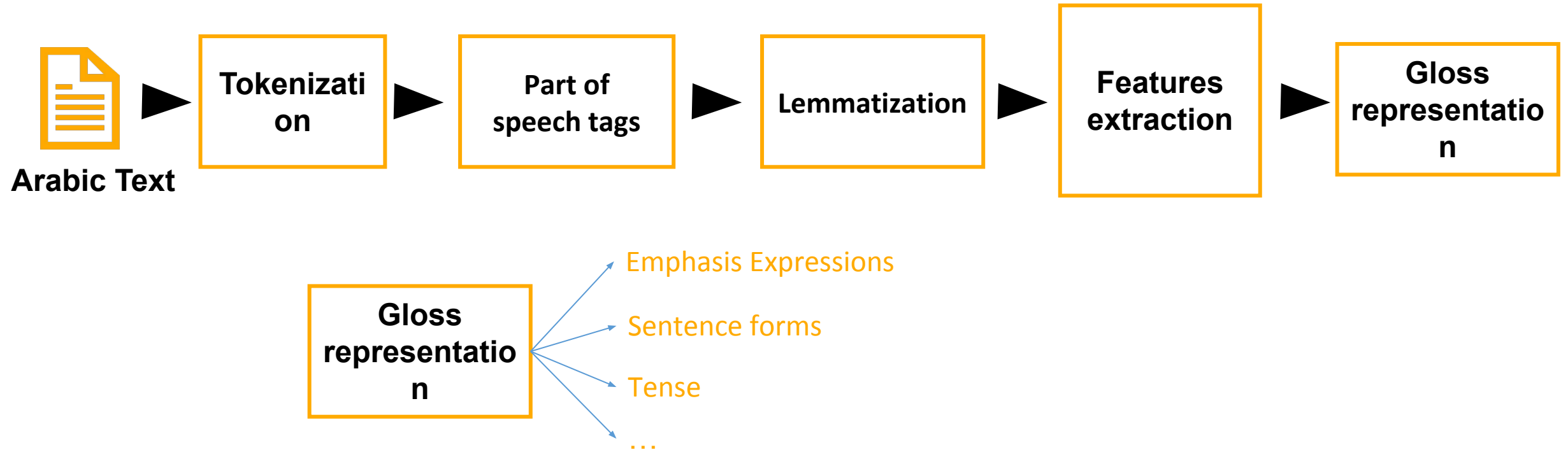


```
{  
  "sign": "ذهب",  
  "video": "./video/dhahaba.mp4",  
  "animation": "./animation/dhahaba.blender",  
  "category": "verb",  
  "length": "2s",  
  "synonymes": "مشي".  
},  
{  
  "sign": "تلميذ",  
  "video": "./video/timidh.mp4",  
  "animation": "./animation/timidh.blender",  
  "category": "affiliation",  
  "length": "3s",  
  "synonymes": "طالب"  
},
```

# Gloss Representation



# Gloss Representation



# Gloss Representation

## Emphasis Expressions

Often/again

مرارا

Very/So

جدا

The exam was very easy جدا كان الامتحان سهلا

# Gloss Representation

## Sentence Forms

### Interrogati

vo What ماذا  
Do هل  
Who من  
How كيف  
When متى  
Where أين

### Negati

ve Not لم  
لا  
ليس  
لن

### Conditio

nal لو  
إذا

# Gloss Representation

Tense

Past

By default  
Negative  
form  
lam(لم)+Verb

لم أسافر البارحة  
I did not travel  
yesterday.

Present

Prefixes : أ، ت، ن، ي  
Layssa (ليس)+  
verb  
la(لا) + verb

أين يقع المغرب؟  
Where is Morocco  
located?

Future

Future particle :  
س  
Lan(لن) + Verb

لن أذهب إلى الطبيب  
I will **not** go to the  
doctor.

# Results

English	When the student will go to the school?
Arabic	متى سيذهب التلميذ إلى المدرسة؟
tokens	['المدرسة؟', 'و', 'إلى', 'و', 'التلميذ', 'و', 'سيذهب', 'و', 'متى']
pos	['PART', 'FUT_PART', 'V', 'DET+NOUN', 'PREP', 'DET+NOUN+NSUFF', 'PUNC', 'PUNC']
lemmas	['مدرسة', 'و', 'إلى', 'و', 'تلميذ', 'و', 'ذهب', 'و', 'متى']
interrogative_boolean	False
interrogative	True
interrogative_label	متى
negative	False
negative_label	False
conditional	False
conditional_label	False
emphasis	False
tense	Future

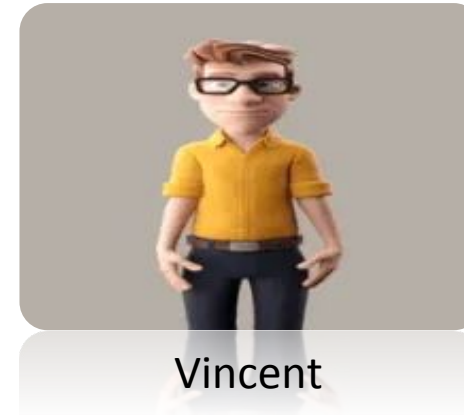
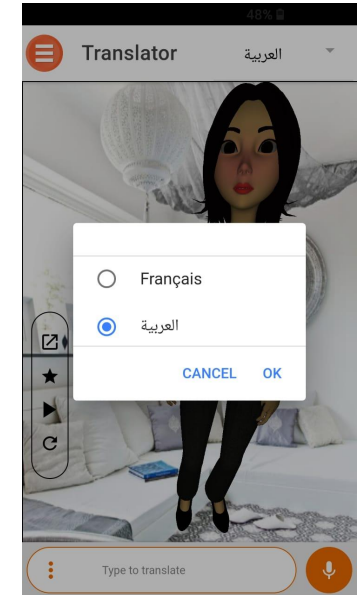
  

English phrase	I won't go to the doctor.
Arabic phrase	لن أذهب إلى الطبيب.
tokens	['الطبيب.', 'إلى', 'أذهب', 'لن']
pos	['PART', 'V', 'PREP', 'DET+NOUN', 'PUNC']
lemmas	['طبيب', 'إلى', 'أذهب', 'لن']
interrogative_boolean	False
interrogative	False
interrogative_label	False
negative	True
negative_label	لن
conditional	False
conditional_label	False
emphasis	False
tense	Future

# Mobile Application

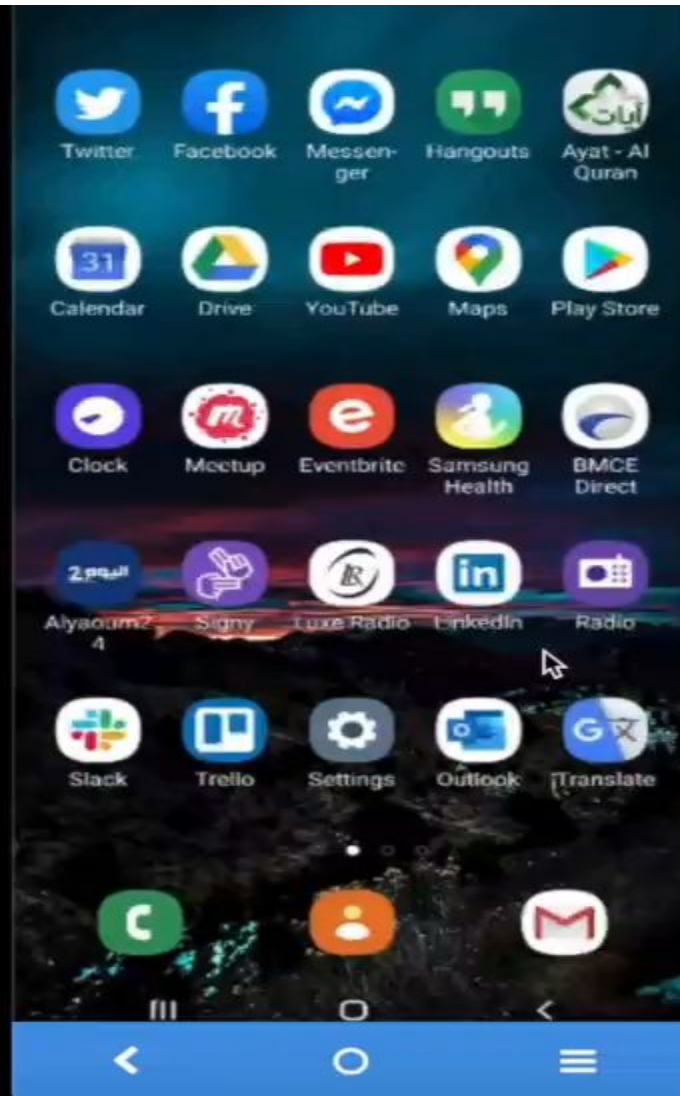
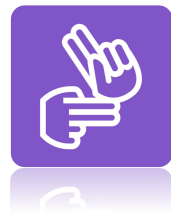


- **Speech-to-text module,**
  - google cloud API services
  - (Arabic and French)
- **Text-to-gloss module,**
  - Needs more research
- **Gloss-to-sign animation module**
  - Big size of Free 'Vincent' character
  - Created 'Samia' from scratch





# Signy v0.0.1



# Thank You !